

3-5 Write and Graph Equations of Lines

Slope-intercept form $y = mx + b$ Standard form $Ax + By = C$ **A, B, & C are integers, A is positive,****A, B, & C have a GCF of 1**

Write the equation of the line given the following information.

1. (0, 8) $m = 3$

$$y = 3x + 8$$

2. (-3, -6) $m = 2$

$$y = 2x + b$$

$$-6 = 2(-3) + b$$

$$0 = b$$

$$y = 2x$$

3. (6, -3) (8, -9)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-9 - (-3)}{8 - 6}$$

$$m = -3$$

$$y = -3x + b$$

$$-3 = -3(6) + b$$

$$15 = b$$

$$y = -3x + 15$$

4. Write the equation of the line \perp to $2x + y = 5$ and passes through (1, -7).

$$y = -2x + 5$$

$$m = -2$$

$$\frac{1}{m} = \frac{1}{-2} \quad (1, -7)$$

$$y = \frac{1}{2}x + b$$

$$-7 = \frac{1}{2}(1) + b$$

$$-7\frac{1}{2} = b$$

$$y = \frac{1}{2}x - 7\frac{1}{2}$$

$$-2\left[\frac{1}{2}x + y = -7\frac{1}{2}\right]$$

$$x - 2y = 15$$

Put in standard form. $x - 2y = 15$ 5. Write the equation of the line \parallel to $3y - x = 4$ and passes through (3, 10).

$$m = \frac{1}{3}$$

$$10 = 3\left(\frac{1}{3}\right) + b$$

$$9 = b$$

$$y = \frac{1}{3}x + 9$$

6. Write the equation of the line \perp to the line containing (4, 3) (4, 8) and passing through (2, -9).

$$m = \frac{8 - 3}{4 - 4} = \frac{5}{0} \text{ undefined}$$

$$\text{vertical}$$

$$\perp \text{ horizontal } (2, -9)$$

$$y = -9$$

7. Write the equation of the perpendicular bisector of \overline{PQ} .
 $P(8,4)$ $Q(12, 6)$

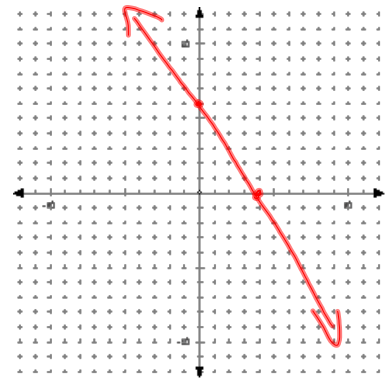
① Find midpoint of \overline{PQ}
 $M\left(\frac{8+12}{2}, \frac{4+6}{2}\right)$
 $M(10, 5)$

② Slope $m = \frac{6-4}{12-8} = \frac{2}{4} = \frac{1}{2}$
 $m = -2$

③ Write the eqn.
 $y = -2x + 25$

Graph $3x + 2y = 12$ using intercepts.

$(0, 6)$
 $(4, 0)$



HW p184 #s 16, 17, 22-24, 26, 31, 34, 38, 46

WRITING EQUATIONS Write an equation of the line that passes through the given point P and has the given slope m .

16. $P(-1, 0)$, $m = -1$

17. $P(5, 4)$, $m = 4$

22. **WRITING EQUATIONS** Write an equation of a line with undefined slope that passes through the point $(3, -2)$.

PARALLEL LINES Write an equation of the line that passes through point P and is parallel to the line with the given equation.

23. $P(0, -1)$, $y = -2x + 3$

24. $P(-7, -4)$, $y = 16$

26. $P(-2, 6)$, $x = -5$

PERPENDICULAR LINES Write an equation of the line that passes through point P and is perpendicular to the line with the given equation.

31. $P(-1, 1)$, $y = \frac{7}{3}x + 10$

34. $P(0, -5)$, $x = 20$

GRAPHING EQUATIONS Graph the equation.

38. $4x - y = -8$

PERPENDICULAR BISECTORS Find the midpoint of \overline{PQ} . Then write an equation of the line that passes through the midpoint and is perpendicular to \overline{PQ} . This line is called the *perpendicular bisector* of \overline{PQ} .

46. $P(-4, 3)$, $Q(4, -1)$